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Abstract

THE REACTOR CABRI

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It has become necessary to construct in France a reactor which would permit the investigation of the conditions of functioning of future installations, the choice, the testing and the development of safety devices to be adopted. A water reactor of a type corresponding to the latest C. E. A. constructions in the field of laboratory or university reactors was decided upon : it appeared important to be able to evaluate the risks entailed and to study the possibilities of increasing the power, always demanded by the users ; on the other hand, it is particularly interesting to clarify the phenomena of power oscillation and the risks of burn out.

The work programme for CABRI will be associated with the work carried out on the Americain "Sperts" of the same type ; during its construction, very useful contacts were made with the American specialists who designed these reactors.

A brief description of the reactor is given in the communication as well as the work programme for the first years with respect to the objectives up to now envisaged.

Translation provided by courtesy of the submitting Government

Rough description of the reactor.

CABRI is an open core swimming-pool reactor without any lateral protection, housed in a reinforced building with controlled leakage, in the Centre d'Etudes Nucléaires de Cadarache. It lies alone in the middle of an area whose radius is 300 meters long. Control and measurements equipment stand out on the edge of that zone. It consumes "MTR" fuel elements. The control-safety rods are propelled by compressed air. The maximum flow rate of cooling circuit is 1500 m^3/h. Transient measurements are recorded in a RW330 unit.

Aims and work programme.

CABRI is meant for :

- studies on the safety of water reactors :

- for the definition of the safety margins under working conditions : research of maximum power at which a swimming-pool reactor may operate with respect to a cooling accident, of local boiling effect on the nuclear behaviour of the reactor, performances of the control and safety instruments under exceptional circumstances ...

- experimental investigations on power excursions linked with precise initial conditions : the aim of this work is to define the basis for theoretical research, and the limits beyond which the risks of explosion cease to be negligible. The research work will be done so as to enable checking with outside reactor experiments and to continue them in the explosion field.

- studies of the behaviour of the reactor control-instrumentation.

- experimental investigations related with transient operation with initial short life (study of boiling, temperature measurements, vacuum pressure and fraction ...) with the aim of defining the hypotheses of a theory on swimming-pool reactor kinetics related to heat transfer phenomena.

- investigations of the behaviour of fuels in reactors (these experiments are planned to be carried out in loops)

Preliminary experimental results.

CABRI went critical on the 21st December 1963. The first transient experiments are expected for March 1964.